New York Agricultural Experiment Station.

GENEVA, N. Y.

PUBLICITY AND PAYMENT BASED ON QUALITY AS FACTORS IN IMPROVING A CITY MILK SUPPLY

H. A. HARDING

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BULLETIN No. 337

PUBLICITY AND PAYMENT BASED ON QUALITY AS FACTORS IN IMPROVING A CITY MILK SUPPLY

H. A. HARDING

SUMMARY

1. This records the results of a study of the influence upon a city milk supply of publicity regarding the sanitary conditions under which the milk was produced and of payment to the producer on the basis of the sanitary quality of the product.

2. In comparing dairies the sanitary conditions surrounding the production and handling of the milk were reduced to a numerical basis by means of a score card. In order to make these numerical results easily understood they were grouped under the following heads: Poor, including filthy conditions; medium, where conditions were merely dirty; good, where the conditions were fairly clean; excellent, where they were both clean and sanitary.

3. There is every reason for thinking that the sanitary conditions of this city supply at the beginning of this study were as good as the average of the cities of the State. A careful initial inspection showed that 37.5 per ct. of the dairies were "poor," 57.5 per ct. "medium" and 5 per ct. "good."

4. At the end of one year 2.9 per ct. of the dairies ranked as "excellent," 58.9 per ct. as "good" and 38.2 per ct. as "medium."

5. At the end of the second year 8.6 per ct. of the dairies ranked as "excellent," 82.8 per ct. as "good" and 8.6 per ct. as "medium."
6. At the end of the third year 12.8 per ct. of the dairies ranked as "excellent," 74.4 per ct. as "good" and 12.8 per ct. as "medium."

7. At the end of the first quarter of the fourth year 12.8 per ct. of the dairies ranked as "excellent" and 87.2 per ct. as "good," the "medium" grade having finally disappeared.

8. While a lack of co-operation between the health authorities and the milkmen is ordinarily the factor which retards improvement in city milk supplies the limit of improvement is set by the disinclination of the consumer to pay a fair price for the labor and expense necessary in the production and sale of clean milk.
INTRODUCTION

In all respects except quality the milk supply of the city of Geneva is fairly typical of that of the smaller cities of the State. In round numbers 13,000 people are supplied by 550 cows distributed among 40 dairies, the larger number of which are within driving distance of the city.

There is every reason to believe that in 1907, at the beginning of the studies here reported, the general quality of the milk supply was representative of that of similar cities. It was not the poor quality of the supply but rather the progressiveness of Mayor A. P. Rose which led to this attempt to study and improve its quality.

The connection of the Experiment Station with this study was indirect and unofficial. A member of the Station Staff was made a member of the Board of Health but the Station was not made responsible in any way for the acts of the Board, nor were the facilities of the Station in any way placed at its disposal.

Members of the Station Staff are studying the relative importance of the various factors that affect the quality of the milk supply. These observations bring out so clearly the importance of two factors that have not previously been studied that it seems desirable to present these factors to the public in this bulletin.

The aim of this study was to find a way by which the small city with its limited facilities may obtain as sanitary a milk supply as the largest cities with their technically trained advisers and expensive equipment.

The method employed was to score each dairy quarterly upon the basis of the sanitary conditions under which the milk was being produced, to furnish this score to the producer and retailer so that it could be made the basis of payment under their contracts, and to publish the score of all of the producers, with the names of their retailers, so that the consuming public could purchase intelligently.
ACKNOWLEDGMENTS

Thanks are respectfully rendered to the Board of Health for its permission to use the city records and to the Geneva Milk Company and the White Springs Farm Dairy Company for data of various kinds.

Recognition should also be made of the fact that the improvement in the milk supply was almost entirely due to the intelligent action of the milk producers and retailers, foremost among whom was Mr. A. G. Lewis. To him more than to any other one person was due the rapid improvement in dairy conditions, an illustration of the efficiency of a knowledge of practical affairs when employed in the highest type of social service.

If the presence of a public spirited individual in connection with the milk business was peculiar to Geneva alone there would be little hope of repeating in other cities the results here obtained. Fortunately a careful study of the milk business in practically every city will demonstrate the presence of one or more stockholders in milk handling companies, dealers or large producers who are endowed with a proper sense both of their responsibility to the public and of the business importance of handling the highest grade of product which the market will sustain. Such men will support heartily any sane business-like effort to improve conditions.

THE LOCAL SITUATION

In order to make the local situation plain the more important factors will be discussed under appropriate headings:

Ordinances.—The vital enactment under this head provides that no person shall sell milk without a license from the Board of Health and that no one shall sell milk from a dairy, the owner or manager of which refuses to permit full and frequent inspection. The penalty of losing his license and consequently his right to do business is sufficient to cause a dealer to report new dairies before undertaking to sell their product and the ability of the Board to exclude their product, if the privilege of inspection is
refused, causes all dairies to welcome inspection. In short, both parties have everything to gain and nothing to lose by obeying the ordinance.

Among the minor items in the milk business there are none of greater sanitary importance than those surrounding the collection, cleaning and refilling of the milk bottles. As handled in many of the smaller cities, the glass milk bottle is the greatest menace to the public health which exists in connection with the milk business. At present the sanitary handling of milk bottles in such cities is practically an unsolved problem, and an ordinance covering this question was not attempted.

The Inspector.—The opportunity for securing the information having been provided, the next requirement was the individual to get the facts regarding the dairies. In all New York cities this individual must be procured through a civil service commission. The most promising candidate offered by the Commission was a railroad baggage-master whose technical acquaintance with dairying was restricted to hazy recollections of his boyhood on a fruit farm. Appeals to the local and State Civil Service Commissions for a new eligible list having been refused, the man was appointed. He proved to be honest and quick to learn. Some years of observations of dairies, supplemented by a "short course" in dairying at Cornell University, transformed him into an efficient inspector. However, it was a slow and costly process. The most trying feature was the fact that this inspector was required to visit dairymen at the time when the new plan was being presented, when his extreme ignorance on dairy matters could not escape them. As a natural result, they were at first strongly prejudiced against the entire undertaking.

The importance of the Inspector having sufficient knowledge of dairying to command the respect of the dairymen should not be underestimated. The co-operation of the dairymen is essential to the success of the undertaking, and their co-operation cannot be expected as long as they believe that their dairies are being scored by a man who does not know enough about the business to judge
fairly. Until the dairymen's confidence is won, progress is extremely slow.

As a representative of the Board of Health, the Inspector should understand that his presence on the farm is a mutual courtesy and that his duty is to observe and record conditions as they exist. If he is beyond the limits of the municipality he is entirely without authority to issue orders, and the assumption by the Inspector of authority which the dairyman knows he does not possess is a common and fertile source of friction in such inspection.

The supply of dairy inspectors is smaller than the demand and the qualifications of many who are available leaves much to be desired. For satisfactory inspectors we must look to those possessing a combination of the theoretical training of the agricultural schools with practical experience in the more sanitary dairies.

Score card.—The object of dairy inspection was to collect the facts regarding the sanitary conditions under which the milk was produced for the purpose of submitting the same to the producer, the retailer and the consumer. As a means of arranging these facts so that their significance can be readily grasped by all parties, the dairy score card is the best available device.

At the beginning of this work there were, and at present there still are, a number of dairy score cards in use. Each of them has its good points and no one of them is perfect.

The card used at Geneva was devised by Dr. R. A. Pearson while he was at the head of the dairy department in Cornell University, and is known as the Cornell University Dairy Score Card. Both sides of this card as used at Geneva are reproduced on pages 85 and 86.
CITY OF GENEVA

Score Card for Production of Sanitary Milk

Date.................................................. Dairy of.............................................. P. O..............................................
Retailed by...........................................

<table>
<thead>
<tr>
<th>1. HEALTH OF THE HERD AND ITS PROTECTION.</th>
<th>Perfect</th>
<th>Score</th>
<th>Cuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and comfort of the cows and their isolation when sick or at calving time.</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location, lighting and ventilation of the stable.</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and water.</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. CLEANLINESS OF THE COWS AND THEIR SURROUNDINGS.</th>
<th>Perfect</th>
<th>Score</th>
<th>Cuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows.</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable.</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barnyard and pasture.</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stable air (freedom from dust and odors).</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. CONSTRUCTION AND CARE OF UTENSILS.</th>
<th>Perfect</th>
<th>Score</th>
<th>Cuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of utensils and their cleaning and sterilizing.</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water supply for cleaning and location and protection of its source.</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Care of utensils after cleaning.</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of small-top milking pail.</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. HEALTH OF EMPLOYEES AND MANNER OF MILKING.</th>
<th>Perfect</th>
<th>Score</th>
<th>Cuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health of employees.</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean over-all milking suits and milking with clean, dry hands.</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quiet milking, attention to cleanliness of the udder.</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. HANDLING THE MILK.</th>
<th>Perfect</th>
<th>Score</th>
<th>Cuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prompt and efficient cooling.</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handling milk in a sanitary room and holding it at a low temperature.</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection during transportation to market.</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL OF ALL SCORES........... 500

If the total of all scores is 480 or above............................... 90 or above................ EXCELLENT
450 or above............................... 80 or above................ GOOD
400 or above............................... 60 or above................ MEDIUM
Below 400............................... Or any division is below 60........ POOR

The sanitary conditions are Scored by...........................................
1. HEALTH. No evidence of chronic or infectious disease or of acute disease in any member of the herd on the dairy premises. Freedom from tuberculosis proven by the tuberculin test made within one year.

COMFORT. Protection from weather extremes. Stall comfortable,—at least 3' wide for a small cow, or 3½' for a large cow; length of stall sufficient for cow to rest easily. Sufficient bedding. Frequent out-door exercise.

ISOLATION. Removal of cows to comfortable quarters outside of the dairy stable, when sick or at calving time.

LOCATION OF STABLE. Elevated, with healthful surroundings.

LIGHTING. As light as a well lighted living room, and with not less than four square feet for light from the east, south or west, for each cow.

VENTILATION. An adequate ventilating system of the King or other approved pattern, and, except when the stable is being cleaned, no marked stable odor.

FOOD. Clean, wholesome feeding stuffs, fed in proper quantities.

WATER. Clean, fresh water, free from possibility of contamination by disease germs.

2. COWS. Cleaned by thorough brushing, and where necessary by washing; no dust nor dirt on the hair (stains not considered). The udder thoroughly cleaned by brushing at least thirty minutes before milking, and by washing just before milking, leaving the udder damp to cause dust to adhere.

STABLE. Free from accumulation of dust and dirt except fresh manure in the gutter. Apart from horses, pigs, privy, poultry-house, etc.

BARNYARD AND PASTURE. No injurious plants, no mudhole nor pile of manure or any decaying substance where cows have access.

STABLE AIR. Free from floating dust and odors. Tight partitions or floor between the space occupied by cows and that used for storage of feed or other purpose.

3. CONSTRUCTION OF UTENSILS. Non-absorbent matter and every part accessible to the brush, and, except inside of tube, visible when being cleaned.

CLEANING. Thorough cleaning with brush and hot water, and rinsing. No laundry soap. Thorough sterilizing.

WATER. From a source known to be pure: protected from contamination from seepage, or surface drainage.

CARE OF UTENSILS. Such as to avoid contamination by dust as well as coarser dirt.

SMALL-TOP PAIL. With opening not over seven inches in diameter, and at least one third of this opening protected by hood.

4. EMPLOYEES. Free from contagious disease and not dwelling in or frequenting any place where contagious disease exists.

MILKING SUITS. Freshly laundered and clean; ample to protect from dust and dirt, from the milker's person or clothing.

MILKER'S HANDS. Hands and teats dry when milking. Hands thoroughly cleaned before milking each cow.

5. COOLING. Cooled within fifteen minutes of milking, to temperature below 50 degrees F.

HANDLING. In a room used exclusively for handling milk, and free from dust, dirt and odors; and the milk after being cooled, always at a temperature below 50 degrees.

PROTECTION DURING TRANSPORTATION. Protected from dirt by tightly closed receptacles, temperature always below 45 degrees F.: not delayed in transit, reaching market within twenty-six hours after milking.
It is evident that this score card, without supplementary information, is too general to be of any value in the hands of an untrained inspector. To meet this situation Dr. Pearson prepared the blank reproduced below and on succeeding pages.

BOARD OF HEALTH, CITY OF GENEVA, N. Y.

Milk Inspection.

Dairyman ........................................ Date ......................
P. O. ........................................ Location ....................
No. Cows milking .... In herd .... Qts. Milk .... Cans or Bottles ....
Milk sold to ................................ License No ................
Report by ................... At milking time? .... Hour ..............

I. Health of the herd and its protection.

Do all cows appear healthy? ..............
Are udders sound and free from signs of disease? ..............
Are cows tuberculin tested? ..............
Date of last test? ....................... By whom? ................
Number of cows added to herd since last test ..............

Is the stable well built to protect from the weather? ..............
Are cows brought in during bad storms? ..............
How many hours are the cows out daily? ..............
Width of stall .............. Length ..............
In the stall comfortable? .............. (Rigid or swing stanchion) ..............
Kind and quality of bedding? ..............

Where are the cows kept when sick and at calving time? . Comfortable? ..

Is the stable well located? .............. In separate stable? ..............
Comfort of place ..............

Number of and size of windows .............. Distribution of light ..............
Are the windows clean? ..............
Size of the stable, length .............. width .............. height ..............
Number of stalls ..............
How ventilated? ..............

[For actual use these questions are printed in a 4-page, 8½ by 11 inch folder, the following note appearing at the top of the second page, otherwise blank:]

Sketch rough diagram, showing position of barnyard, cowstable, hay barn, outbuildings and milk room. Indicate points of compass.
Kinds of feeds used
Are they of good quality and proportions?
Source of water for cows
Method of watering
Cleanliness of troughs

II. Cleanliness of the cows and their surroundings.
Are the cows clean? How are they cleaned?
Is the hair clipped about the udder?
Is the udder cleaned before milking? How? How long before?

Is the stable free from the accumulation of cobwebs, dirt and dust?
Is the stable whitewashed? When done?
Kinds and number of other animals, if any, in same room with cows
Same, adjacent rooms
What openings, between?
Is the stable protected from such sources of contamination as privy, etc.?
How often is the manure removed from the stable?

How far is manure removed from stable?
Is the barnyard free from manure pile? And mud holes?
Is the pasture clean and free from injurious plants? And mud holes?

Is stable provided with dust-tight ceiling? And dust-tight partitions?
Stable floor of wood, cement or ground? Conditions of same?

Is the feeding done before or after milking? How long before?
Is the floor swept or dampened before milking? How long before?
Is the air free from dust and odors?

III. Construction and care of the utensils.
Are all utensils such that they can be thoroughly cleaned?
Method of washing utensils?
How are the utensils sterilized?
How soon after use are utensils washed?

Is the water used for washing utensils pure? How do you know?
What is its source?
Is the source protected against contamination?

How are utensils cared for after cleaning?

Is a small top pail used for milking?
If so, what style and size of opening?

IV. Health of employees and manner of milking.
What evidence is there of absence of contagious disease and of exposure of family and employees to disease?
Who is the family physician?
Are the milkers clean personally?.............
Do the milkers wear clean over-all suits?.............
How often are the over-alls washed?.............
Where are the suits kept?............... 
Do the milkers wash their hands just before milking?.....Where?.....
Do milkers have wet hands when milking?.............

Are milkers careful not to dislodge hair and dirt from the cow while milking?.............
Is switching of cow's tail prevented during milking?.............

V. Handling the milk.
How is the milk cooled?..................
How soon after milking is the milk cooled?.............
To what temperature?.............

Is the milk handled in a room detached from the stable?.............
How far from stable?.............
What kind of floor?.............Condition of same.
Is the milk room used exclusively for milk, and is it free from dirt and odors?.............
At what temperature is the milk kept after cooling?.............

How is milk cared for during transportation to market?.............

The questions in this blank are intended to cover all of the items which are of sanitary importance in all but the most unusual conditions. In practically all cases the answers are either "yes" or "no," the exceptions being where the answer is a dimension, a quantity or a temperature. This blank can be accurately filled out by any one of ordinary intelligence. Since many of the observations can best be made at milking time, the Inspector quite uniformly visited the dairies at that time, additional visits being made when circumstances indicated that it was desirable.

The facts having been recorded, the next step was to reduce them to a numerical basis. This was done by the Inspector and the author working together. At first the Inspector contributed little aside from his record. Gradually he came to take a larger part in the scoring until finally the author acted merely in an advisory capacity regarding new features and reviewed the final
scores. In scoring, a dairy was credited as perfect in each particular unless some objectionable condition or practice was found. Deductions or cuts from the perfect score were made in accord with the following schedule, the aim being to make identical cuts for similar conditions.

**Score Card Cuts Used* at Geneva.**

**Health of Herd and Its Protection.**

No tuberculin test, 12.
Old tuberculin test (over one year), 12.
Rigid stanchions (not cut when cows were confined only during milking, as in summer), 3.
Light, 1 to 5, according to conditions.
No special system of ventilation, 2.
Ventilation, 1 to 5.
No comfortable provision for isolation or calving outside of stable containing milking cows, 5.
Stable poorly built to protect from the weather, 1 to 5.

**Cleanliness of Cows and Their Surroundings.**

Manure or dust on cows, 1 to 10.
Hair about udders not clipped, 1.
Damp cloth not used on udders before milking, 2.
Litter or roughage on stable floor, 1 to 5.
Ceiling not tight, 1 to 5.
Cobwebs and dust in stable, 1 to 5.
Stable not whitewashed within one year, 5.
Horse in cow stable, 5.
Manure not removed once per day, 1 to 10.
Manure or mud in barn yard to which cows have access, 1 to 10.
Feeding dry feed just before milking, 1 to 10.
Objectionable odors in stable, 1 to 5.

**Construction and Care of Utensils.**

Insufficient cleaning, 1 to 5.
No special sterilization (no steam), 5.
No. small-topped pail, 15.

**Health of Employees and Manner of Milking.**

No special clean milking suits, 5.
Dirty suits, 1 to 5.
Milking with wet hands, 10.
Unclean hands, 1 to 6.

*These were the cuts as applied to actual conditions. More unsanitary surroundings would merit greater cuts than those indicated.
HANDLING THE MILK.

Not efficiently cooled (50° F. or below),
50° to 60°, cut 5.
61° to 70°, 10.
above 71°, 15.
Not held at 50° F. or below, 5.
Milk strained in stable, 5.
Milk room not clean, 1 to 5.
No milk room, 3.

Methods of publicity.—The two prime essentials in this connection are, first, that the health authorities be protected from legal responsibility for financial losses resulting from the publication of the facts; second, the results of the dairy inspection should be made accessible and intelligible to the largest possible number of people.

As will be explained, the feature of publicity was introduced in successive steps, but in its final form it met these requirements fairly successfully.

The best protection against legal action is to conduct the inspection in such an evidently impartial manner as to obtain the support of all parties. The legal phase of publicity was further provided for by the following arrangement. The Inspector reported to the Dairy Products Committee. This committee reported to the Board of Health, the report being accepted and entered in the minutes. This portion of the minutes was published by the press as a part of the proceedings of the Board.

In the matter of publicity the three classes, the producers, the retailers and the consumers were considered separately. Each producer was furnished with a carbon copy of his official score card. Each retailer was given the numerical score of the producers whose product he was handling. The consumers were reached by the quarterly publication of the standing of each producer, with the name of the retailer who was distributing the milk. The official score card for each dairy was placed on file with the clerk of the Board, where it could be easily consulted by any one who was interested.
Milk producers.—Geneva is located in a region of intense fruit cultivation and all of the milk producers are engaged in mixed farming. The number of dairies supplying milk has ranged from 30 to 40, and the number of cows has also varied. In June, 1910, the 33 dairies included 532 cows, of which somewhat less than 500 were then furnishing milk. A single large dairy contained 100 cows, the others ranging from 7 to 38 cows with an average of 13. Practically all of the dairies were located within a five-mile radius of the city and the milk was hauled in on wagons, though a few producers shipped by trolley, and after October 31st, 1910, the milk from three dairies was shipped 25 miles by rail.

The cows were mainly grades, with a predominance of Guernsey and Jersey blood, Holstein being the next most common admixture. Two of the herds furnished milk carrying approximately 5 per cent. fat. While the average fat content was not determined in connection with this study, the tests made by the State Department of Agriculture indicated an average of about 3.8 per cent. Practically every year some dairy paid the penalty for furnishing milk which was below the legal standard.

This study of the milk supply was confined to the sanitary conditions under which the milk was produced. It is recognized that production is only a part of the problem of a municipal milk supply. On the other hand, it should not be forgotten that our milk supply cannot be cleaner than at its source nor purer than when it leaves the farm. In the supply of larger cities many things may happen to milk during transportation and distribution, but in the smaller cities these elements are of much less relative importance.

Milk retailers.—At the beginning of this study milk was being distributed by 13 retailers, 5 of whom were producing a part or all of the milk that they distributed. There was one dairy company, equipped with modern facilities for cooling and handling milk, and this company was distributing the product of 11 dairies.

In 1909, 9 of the small retailers combined and established another station equipped with modern machinery. From this time until late in 1910 the milk business was handled by these two
companies and a single retailer who produced his own milk. In November, 1910, a fourth distributor began business, handling the product of three new dairies.

Any comprehensive study of a milk supply should give considerable weight to the conditions under which milk is handled by the retailer. These conditions could undoubtedly be best compared through a score card but unfortunately there was no suitable score card available. Therefore there is no accurate record of the improvements which have been accomplished by the retailers.

At the beginning of this study each of the smaller retailers stored the milk and washed the milk utensils and containers at his home in close contact with his family. In only one of these cases was steam available in connection with the cleaning process. Now practically all of the milk is handled in central stations which are equipped with steam and modern machinery. This change marks an important step in the direction of a better milk supply.

**INITIAL QUALITY IN 1907.**

*First inspection.*— Logically, the first step was to get the facts regarding the quality of the milk supply, and this was done in September and October, 1907, by having the Inspector visit each dairy and fill out the report blanks given on pages 87-89. The Inspector left a duplicate of his report with each dairyman so that he might know exactly what was reported to the Board of Health. In only one instance was exception taken by a dairyman to an item thus reported, and this exception related to an unimportant detail.

The scores of the dairies were prepared from these blanks, supplemented by verbal descriptions by the Inspector. The points regarding which the report blanks were most deficient were the extent of the deficiency of light and ventilation, the amount of dust and cobwebs in the stable, the extent of the openings in the ceiling and the amount of dust and intensity of odors in the stable air.
Of the 40 dairies then furnishing the milk supply of Geneva the sanitary conditions of 2 ranked as "good," 23 as "medium" and 15 as "poor." The mathematical average of all of these scores was 411 points. The wide difference in individual dairies is illustrated by the cuts given to the dirtiest and the cleanest.

**Dirtiest Dairy.**

<table>
<thead>
<tr>
<th>Cuts</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tuberculin tests</td>
<td>12</td>
</tr>
<tr>
<td>Barn draughty from poor construction</td>
<td>10</td>
</tr>
<tr>
<td>Drainage location bad</td>
<td>5</td>
</tr>
<tr>
<td>No windows in stable</td>
<td>10</td>
</tr>
<tr>
<td>Manure on cows</td>
<td>10</td>
</tr>
<tr>
<td>Udders not clipped</td>
<td>1</td>
</tr>
<tr>
<td>No damp cloth used on udders</td>
<td>2</td>
</tr>
<tr>
<td>Ceilings open</td>
<td>5</td>
</tr>
<tr>
<td>Stable not whitewashed</td>
<td>5</td>
</tr>
<tr>
<td>Cobwebs and dust</td>
<td>5</td>
</tr>
<tr>
<td>Other animals in stable</td>
<td>5</td>
</tr>
<tr>
<td>Floor broken and littered with refuse</td>
<td>5</td>
</tr>
<tr>
<td>Mud and manure in barn yard</td>
<td>7</td>
</tr>
<tr>
<td>Feeding dry feed before milking</td>
<td>10</td>
</tr>
<tr>
<td>Dust and strong odor in stable</td>
<td>5</td>
</tr>
<tr>
<td>No steam for cleaning utensils</td>
<td>5</td>
</tr>
<tr>
<td>Washed utensils left in dust</td>
<td>5</td>
</tr>
<tr>
<td>No small-topped milk pails</td>
<td>15</td>
</tr>
<tr>
<td>No special milking suits</td>
<td>5</td>
</tr>
<tr>
<td>Milk not cooled to 75°F</td>
<td>15</td>
</tr>
<tr>
<td>No milk room</td>
<td>3</td>
</tr>
<tr>
<td>No attempt at holding milk cold</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
</tr>
</tbody>
</table>

Dairy scores 345 and ranks as Poor.

**Cleanest Dairy.**

<table>
<thead>
<tr>
<th>Cuts</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No small-topped milk pails</td>
<td>15</td>
</tr>
<tr>
<td>Milk not cooled to 60°F</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
</tbody>
</table>

Dairy scores 480 and ranks as Good.
Each producer was furnished with the score of his dairy and each score card bore a list of the cuts similar to those given above.

There is no question but that any one knowing the conditions in these two dairies would be unwilling to pay the same price for the product of both and the more discriminating consumers would object to the milk from the dirtier dairy at any price. Further, it should be remembered that there were 14 more dairies in the same class with this dirtiest dairy and only 1 other in the class with the cleanest while there were 23 in the intermediate class. The mathematical average of all of the dairies was only 11 points above the turning point between "poor" and "medium."

MEETING OF BOARD OF HEALTH, MILK PRODUCERS AND MILK RETAILERS.

A meeting of the dairymen was called, the variations in the quality of the milk supply explained to them, and their co-operation in improving conditions was asked. It was explained to them that the Board did not intend to coerce them in any way, but that it intended to put the sanitary conditions surrounding each dairy fairly before the public in order that the public might be able to buy the cleanest milk that the market afforded. It was also stated that a reasonable time would be allowed the producers to adapt their methods to the new conditions before the results of the examinations were made public.

It was also suggested that inasmuch as the annual contracts between the producers and the retailers were to be made within a few months it would be desirable for both parties to have an understanding regarding the quality of milk covered by such contracts since before the year expired the retailer would be offering the product to a public which was informed concerning the sanitary conditions under which the milk was being produced.
PROGRESS IN 1908.

Second inspection.— To facilitate the making of contracts under these new conditions, a second scoring was completed early in 1908. Each producer was furnished with a copy of his own score bearing a complete list of the points for which deductions had been made, similar to those given on page 94. At the bottom of the score was written the following: "Mistakes in scoring will be cheerfully corrected. Arrows indicate points at which the score could be improved at slight expense. It would not be difficult to bring this dairy up to the —— grade." These scores were furnished sufficiently in advance of the quarterly report to permit of making corrections before the final report of the Dairy Products Committee was made to the Board of Health. While only a few changes were suggested by the dairymen, these suggestions were always considered and usually followed, with the understanding that at future inspections these points must be found as represented by the dairymen. In no case did they fail to keep their word in such matters.

The first inspection for 1908, which was completed early in January, showed that in the first three months the efforts of the Board were bearing fruit. The results may be summarized as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>None</td>
</tr>
<tr>
<td>Good</td>
<td>7</td>
</tr>
<tr>
<td>Medium</td>
<td>28</td>
</tr>
<tr>
<td>Poor</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
</tr>
</tbody>
</table>

Average score .................................. 432 points.
Increase over previous score ................... 21 points.

The two dairies which quit voluntarily were in the "poor" class. Two of the three remaining dairies in that class gave notice that they would quit with the expiration of their annual contracts, and the third dairy in the "poor" class was almost up to the
"medium" grade. The net result of this first three months of inspection was to eliminate almost completely the large supply of poor milk which had been distributed in our city in the past. This was brought about without any friction and without raising the retail price of milk.

Annual contracts partly based on quality.— The milk from five of the dairies was being retailed by the owners, who naturally had a financial interest in obtaining a high score. In the case of practically all the other dairies some more or less distinct understanding was arrived at between the producer and the retailer regarding the improvement in conditions of production which were to be made and the standard of production which was to be maintained during the year. It was this prospect of publicity coupled with the financial pressure of the new contracts that produced the marked improvement shown by this inspection.

Third inspection.— The inspection in June, 1908, showed some interesting changes, and the summary was as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>None</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
</tr>
<tr>
<td>Medium</td>
<td>26</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>

Average score ........................................ 436 points.
Increase over previous score .................. 4 points.

During the interval two of the better dairies had transferred to Rochester because they could get a substantial increase in price. This price was more easily obtained on account of the high score which they had received and were able to present. Five dairies quit for business reasons, and one of desirable quality was added to the Geneva supply. An examination of the records shows that there had been distinct improvement in the sanitary conditions surrounding the production of milk in four-fifths of the dairies and an elimination of four of the worst dairies, which were not inclined to improve. This elimination was not through any orders
of the Board but because dealers would not purchase milk from dairies which were notoriously bad when they knew that the facts were to be presented to the public.

During May, 1908, a "Tuberculosis Exhibit," under the joint auspices of the New York State Department of Health and the State Charities Aid Association, was held in Geneva. One day was devoted to bovine tuberculosis. Partly as the result of this exhibit milk from two dairies of tuberculin-tested cows was offered to the public. In one case a large dairy company offered the product of a tuberculin-tested herd at 10 cents per quart. This offer met only a limited response. In the other case a small dealer offered milk from tuberculin-tested cows at the current price, six cents per quart. His custom immediately rose to the limit of his supply. Now for the first time in the history of the city it was possible to obtain commercially a milk which a careful parent could consider safe as a food for children.

At the time the score of each dairy for the second quarter of 1908 was furnished to the producer, he was informed that the next scoring of his dairy would probably be given to the public.

Fourth inspection.—The results of the scoring for the third quarter of 1908 may be summarized as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>21</td>
</tr>
<tr>
<td>Medium</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
</tr>
</tbody>
</table>

Average score ........................................... 449 points
Increase over previous score ...................... 13 points.

This marked gain is significant in showing the effect of publicity in stimulating the production of clean milk. The most marked instance is that of the dairy which at the preceding inspection had been alone in the "poor" class. His card at the June scoring bore the following: "Mistakes in scoring will be cheerfully corrected. Last quarter your dairy scored next to the lowest. The other man quit because no one would buy his
milk. The arrows indicate where your conditions could be improved." Such radical changes were at once instituted in the conditions for obtaining and handling milk that the score rose from 393 in June to 458 in August and that dairy has remained in the "good" class since that time.

This inspection was also noteworthy in that it marked the appearance of the grade of milk known as "excellent." No bacterial counts were made and therefore it can not be said with certainty that the bacteria in this milk were as few as required by the "inspected" milk standard of New York City, but it is highly probable that it would come within this class. It was milk drawn in clean barns, from reasonably clean, tuberculin-tested cows, by clean milkers, into sanitary pails and promptly cooled.

It should be noted that these marked improvements in the general cleanliness of the dairies were made in the face of unusually adverse financial conditions. The annual contracts of the producers had been made in most cases at three cents per quart. The rise which had occurred in feeding stuffs had reached a point where the food cost alone, with careful feeding, was approximately two cents per quart. This left only one cent per quart for the labor, the interest on the investment and the profit on the business. During the summer and fall of 1908 this region suffered from an unusual drought which produced a marked shrinkage of the milk flow, and a corresponding increase in the cost of production. Under the circumstances any increase in the cost of production due to increased care and labor was made at a distinct financial loss. The fact that these improvements were made in the face of these adverse conditions is the most convincing proof of the power of publicity in this connection.

The proposed publication of the scores of the individual producers brought out a protest, particularly from a few producers who had not taken the earlier statements of the Board seriously and had made no effort to improve their dairy conditions. Originally they had been among the better class of producers and they were chagrined to find that they were now outclassed by their competitors. A public meeting was called and the points of
difference were freely discussed. The opposition of the few who were not prepared for publication was outweighed by the approval of the many who stated that they had striven hard to merit a good score and now the publicity was due them and they demanded it.

As reported to the Board of Health and later given by the press the name of each retailer was accompanied by those of the producers whose product he was handling, the name of each producer being followed by the word “excellent,” “good” or “medium.” A copy of the score card for each dairy was also placed on file where it was easily accessible to the public. The attention of the public was called to the fact that the milk offered by any retailer was no more desirable than that of his poorest producer, since if he mixed the milk from all of the dairies it would be all reduced to this level, and if he did not mix it some one would get only this poorest milk.

Fifth inspection. The results of the scoring of the dairies for the last quarter of 1908 may be summarized as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>20</td>
</tr>
<tr>
<td>Medium</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>34</strong></td>
</tr>
</tbody>
</table>

Average score ........................................ 454 points.
Increase over previous score....................... 5 points.

This inspection showed a continuation of the gradual improvement which had characterized the whole year.

Summary for 1908.—The practical results of the study for 1908 were as follows:

The grade of some milk had been raised to “excellent,” no milk of this character having been included in the former supply. This is comparable with the New York City “inspected” milk—a milk drawn in clean barns, from reasonably clean, tuberculin-tested cows, by clean milkers, into sanitary utensils and promptly cooled.
The grade, "good" milk, which originally included 2 dairies had come to include 20 dairies. They provided a reasonably clean, well cooled, but not, ordinarily, a tuberculin-tested product.

The grade, "medium" milk, which originally included 23 dairies, now included only 13. This represented, in the main, dirty milk.

The grade, "poor" milk, which originally included 15 dairies, had been eliminated. This was essentially filthy milk.

During the year two commercial sources of tuberculin-tested milk had been developed. One of these was the "excellent" dairy above mentioned and the other was one of the best dairies in the "good class."

The general wholesale price of milk was 3 cents and the retail price was 6 cents per quart.

The system of publicity was in full operation and giving general satisfaction to all concerned.

The influence of quality on price had thus far worked only indirectly through the five retailing producers who had obtained more custom from the favorable report on the quality of their product and through the commercial rivalry which their success had provoked.

PROGRESS IN 1909.

_Sixth inspection._— The annual contracts between the producers and the retailers practically all dated from April first so that the inspection for the first quarter of 1909 was under conditions quite similar to those at the close of 1908. The results of the inspection for the first quarter of 1909 may be summarized as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>22</td>
</tr>
<tr>
<td>Medium</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

Average score ........................................ 458 points.
Increase over previous score ......................... 4 points.
On April 1st the retail milk business underwent marked changes. Nine retailers, including four of those who were producing all or a part of the milk they retailed, formed a dairy company with a central distributing plant. Thus practically all of the milk was retailed by two companies. In connection with this change in management both companies passed the milk through continuous pasteurizers, heating it momentarily to 106–180° F., more frequently at the lower than at the higher temperature. Such pasteurization has little to recommend it from the standpoint of public health.

In making the annual contracts with the producers, the older dairy company includes a clause whereby any producer would receive three cents per quart so long as his dairy scored "medium," three and one-half cents when it scored "good," and four cents when it scored "excellent." The official score of the dairy for each quarter was to be taken as the basis for making settlements. The new dairy company did not have such a clause in its contracts.

Seventh inspection.—The result of the inspection for the second quarter may be summarized as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>22</td>
</tr>
<tr>
<td>Medium</td>
<td>11</td>
</tr>
</tbody>
</table>

Total 36

Average score 458 points.
Increase from previous score 0 points.

This balancing of the score at this inspection with that for the previous quarter was the result of two forces tending in opposite directions.

The dairies whose product was purchased on a sliding scale based on the quality of milk furnished scored as follows:
The dairies furnishing milk to the company which was not paying for milk on the basis of its quality received the following scores:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>None</td>
</tr>
<tr>
<td>Good</td>
<td>15</td>
</tr>
<tr>
<td>Medium</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

Average score .................................. 453 points.

The dairies furnishing milk on a sliding scale had made marked improvement, two of them having advanced to the "excellent" class and the remainder all being well up in the "good" class. This improvement resulted from the fact that it was more profitable to produce cleaner milk.

At the same time the score of the dairies which were furnishing their milk at a flat price fell an equal amount. This loss was practically confined to the score of those dairies which had previously retailed their own product. No longer having a financial interest in a record for cleaner milk their conditions of production deteriorated in all cases, one dairy falling from a score of 476 points in March to one of 454 points in June. No experiment could have been devised which would have more clearly brought out the intimate relation between method of payment and quality of product.

Ultimately the success or failure of the plan of improving a milk supply as here outlined must turn on the extent to which the purchasing public transfers its custom in accord with the official standard of quality. The scorings of the dairies furnish-
ing these two companies were made public early in July. The records of sales, which have been kindly furnished by the companies, shows that during July, August and September the sales of the company with the poorer public record were 73 quarts, 155 quarts and 242 quarts respectively per day less than during June. The loss of trade did not cease here but continued through November, in which month the average sales were 251 quarts per day less than in June.

It is true that there was a distinct decrease in the total consumption of milk in the city during these months, due partly to the considerable number of people absent on vacations and more largely to an increase in the retail price from 6 to 7 cents per quart in July. The records from the competing company, with its dairies all in the "good" and "excellent" classes, shows that its average sales were 106 quarts less per day for July, 61 quarts less per day for August and 94 quarts per day less for September than the June sales. In October they rose practically to the June standard. The sharp decrease in July was probably due to the fact that the public generally held this company responsible for the advance in price. As soon as the 7 cent rate was accepted by the public it proceeded to purchase milk on the basis of quality. While the public purchased less milk on account of its higher price the decrease in business fell almost entirely on the company offering milk of the poorer quality. This sharp and continued falling off in business forced the company which was buying at a flat price to bring pressure to bear on its producers.

_Eighth inspection._—The results of this are shown in the scores for the third quarter which were made public September 24, 1909. The summary of the scores was as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>20</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
</tr>
</tbody>
</table>

Total 35

Average score 461 points.
Increase over previous score 3 points.
The summary of the dairies selling their product on the sliding scale was as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td>Average score</td>
<td>473 points.</td>
</tr>
</tbody>
</table>

The summary of the dairies whose product was sold at a flat price was as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>None</td>
</tr>
<tr>
<td>Good</td>
<td>22</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
<tr>
<td>Average</td>
<td>458 points.</td>
</tr>
</tbody>
</table>

From this it is seen that the pressure exerted by the consumers upon the retailer led 7 of the producers to improve sufficiently to get from the "medium" into the "good" class. Notwithstanding the vigorous effort which this company was making to get a better supply of milk their adverse tide of trade did not turn and they continued to lose business during the following three months.

Ninth inspection.—The sanitary conditions of the milk supply improved somewhat during the remainder of the year as shown by the following summary of the scoring for the fourth quarter of 1909:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>29</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>35</strong></td>
</tr>
<tr>
<td>Average score</td>
<td>466 points.</td>
</tr>
<tr>
<td>Increase over previous score</td>
<td>5 points.</td>
</tr>
</tbody>
</table>
Of the 9 dairies selling on a sliding scale 3 scored the same as during the preceding quarter and 6 scored higher with a total gain of 90 points. Of the 25 dairies selling to the other company 5 scored the same as before, 3 scored less and 17 scored more with a net gain of 119 points. It is interesting to observe that the single producer who during the preceding quarter retailed his own milk and had been in the "good" class was now selling his milk at a flat price and had lost 5 points, bringing his dairy into the "medium" class.

**SUMMARY FOR 1909.**

During this year the "excellent" class increased from 1 dairy to 3, the "good" class from 20 dairies to 29 and the "medium" class decreased from 13 to 3 dairies.

The average score of all of the dairies increased from 454 to 466, a gain of 12 points. The score of the poorest dairy was 433 and the next one was 434 at the close of 1908. At the close of 1909 the poorest dairy scored 442 and the next 447. This poorest dairy was the one scoring 434 the preceding year, its competitor for lowest place not finding a purchaser for its product in 1909.

**PROGRESS IN 1910.**

*Tenth inspection.*—As has already been noted, the annual contracts between the producers and the retailers were made during March and April. Each year one or more of the cleanest producers transferred to Rochester. The summary of the scores for the first quarter was as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>26</td>
</tr>
<tr>
<td>Medium</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

Average score ........................................ 463 points.
Decrease from previous score ......................... 3 points.
With the beginning of the new contracts the two large companies purchased milk on the basis of the sanitary conditions under which it was produced, the price being automatically regulated by the official score which the dairy received for that quarter.

Eleventh inspection.— The summary of the scores for the second quarter was as follows:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>30</td>
</tr>
<tr>
<td>Medium</td>
<td>1</td>
</tr>
</tbody>
</table>

Total 35

Average score 463 points.
Increase over previous score 0 points.

Twelfth inspection.— The conditions during the third quarter are shown by the following summary of the scores:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>31</td>
</tr>
<tr>
<td>Medium</td>
<td>1</td>
</tr>
</tbody>
</table>

Total 36

Average score 465 points.
Increase over previous score 2 points.

Thirteenth inspection.— The conditions at the close of 1910 are shown by the following summary of the scores:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>5</td>
</tr>
<tr>
<td>Good</td>
<td>29</td>
</tr>
<tr>
<td>Medium</td>
<td>5</td>
</tr>
</tbody>
</table>

Total 39

Average score 463 points.
Decrease from previous score 2 points.

The decrease in the score at this inspection is mainly due to the advent of three new dairies in the "medium" class.
SUMMARY FOR 1910.

From these summaries it is seen that the average quality of the milk supply remained practically constant during the entire year. Two more dairies were added to the "excellent" class and until the last quarter the "medium" class was represented only by the one dairy which had been at the foot of the list during the preceding year. During the last quarter one of the other dairies dropped back to the "medium" class and three new dairies were added to the supply, all three being in the "medium" class. These latter three dairies are nearly up to the "good" grade and soon made the changes necessary to put them into that class.

PROGRESS IN 1911.

The score cards for the first quarter of 1911 show, for the first time, no milk sold in Geneva from the "poor" or "medium" classes, a condition probably not true of any other city of its size in the United States.

Fourteenth inspection.—The records for the first quarter of 1911 give the following summary of scores:

<table>
<thead>
<tr>
<th>Grading</th>
<th>No. Dairies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>5</td>
</tr>
<tr>
<td>Good</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

Average score                  463 points.
Increase over previous score    2 points.

TUBERCULIN TEST.

Attention has already been called to the fact that a commercial source of tuberculin-tested milk was provided in 1908 and milk of that quality has been available to the public since that time.

Early in 1910 the milk retailers requested the Board of Health to pass an ordinance forbidding the sale in the city of milk other than that from tuberculin-tested cows.
Since the milk producers are the ones most immediately affected by such an ordinance they were asked to meet with the Board and express their views upon the proposed ordinance. At this meeting all but one of the producers were represented in person or by proxy. The problem of bovine tuberculosis and the part which the State Department of Agriculture was prepared to take both in testing and in indemnifying for reacting animals was presented by Dr. J. F. DeVine of that Department. After the meaning of the proposed ordinance had been made plain each producer was asked to state the number of cows he possessed and his position with regard to the ordinance. The owners of almost exactly 90 per cent of the 532 cows in the dairies furnishing milk to Geneva expressed themselves as favorable to the ordinance. With a single exception the remaining dairymen stated that they did not favor the ordinance but would cheerfully abide by it if passed. One dairyman, owning approximately 2 per cent of the cows, stated that he would withdraw from the market if the ordinance was passed.

The largest producer, who strongly favored the ordinance, offered, in case the removal of diseased animals produced a temporary shortage of milk, temporarily to enlarge his herd sufficiently to supply this shortage until his colleagues could replenish their herds. The milk retailers also informed the Board that they would not take advantage of the situation to raise the retail price of milk above 7 cents per quart.

A public meeting for the milk consumers was next called and approximately 100 consumers appeared. After a presentation of the proposed ordinance and its relation to the consumer had been explained by Dr. V. A. Moore, a motion to recommend the adoption of the ordinance was passed with but three dissenting votes.

The objection raised by those dissenting was that the exclusion of the milk from untested cattle would tend to form a monopoly in the milk business and also that the word of the milk retailers was not a sufficient protection against a rise in price.
After further considering the proposed ordinance the Board of Health disposed of the matter by adopting the following:

"This Board having examined the subject of using milk from other than tuberculin-tested cows, and having become satisfied that the use of such milk is attended with danger to the public health, and it having been made to appear to the satisfaction of the Board that there is now in Geneva a considerable supply of milk from tuberculin-tested cows, but not sufficient for all consumers,

"Resolved, That this Board recommend to the public that milk from other than tuberculin-tested cows be not used unless cooked, and especially that such milk be not used for children, and

"Further resolved, That all producers supplying milk to consumers in the city having cows which have not been subjected to the tuberculin test, be urged to have such test made as soon as practicable, to the end that none but tuberculin-tested milk may be furnished to the residents of the city."

Although this proposed ordinance did not receive the sanction of the Board of Health the number of tuberculin-tested cows increased until at the close of 1910 at least 37 per ct. of the cows in the herds furnishing milk to Geneva were tuberculin tested. Unfortunately the conditions were such that the milk from these tuberculin-tested animals was mixed with that from untested herds in all cases except where such milk was offered at an increased price. Under such circumstances the general public did not obtain any benefit except through diluting the milk from diseased animals.

The question of basis for credit for the tuberculin-test presented some difficulties. Where the milk from a tested herd was not retailed as the product of tuberculin-tested animals only one test of the entire herd was required per year. At the time of the other three quarterly examinations no statement to the effect that no untested animals had been added to the herd was required from the dairyman. At the same time it was suggested that he could not afford to add untested animals to a sound herd. It is believed
that more good was actually accomplished by these tactics than would have resulted from more stringent requirements, and that very few untested cows were admitted to tested herds. Where the milk is retailed as the product of tuberculin-tested cows there is no question but that it should be exactly as represented.

The question of what is satisfactory evidence of a proper tuberculin test is also debatable. The statement of a veterinarian might be accepted but this is not always a satisfactory arrangement. One dairyman furnished the statement from a veterinarian that he had "examined the herd of ______ _____ (using tuberculin test) and found them free from tuberculosis." A request for the records of the test brought a statement showing that the temperatures had been taken at 7 and at 9 the day before, and at 6 and at 9 the day after, not stating whether the observations were made in the forenoon or the afternoon nor that any tuberculin had been used. As the product of this herd was not being retailed as tuberculin-tested milk the interested parties were informed that inasmuch as the dairyman had paid his money for the test in good faith he would be given credit for it, but that in future no such testing would be tolerated. Some months later a retest of this herd by a competent veterinarian gave five reacting animals.

The procedure as adopted was to give credit for a tuberculin test only after receiving the detailed records of such test signed by the veterinarian, with a sworn statement by the dairyman that the test included his entire herd. A sworn statement by the veterinarian was not considered necessary after the passage of the State law making any irregularity on his part punishable by the loss of his right to practice in the State. The incident above given occurred before the passage of this law. Since, under the present law, the records of the tuberculin tests are filed with the State Department of Agriculture an approval of the test by that Department was accepted in lieu of the detailed records.
GRAPHICAL REPRESENTATION.

The variations in the quality of the milk supplied during the three years covered by this study are clearly brought out in Chart I. It will be noted that the "poor" milk disappeared after the second inspection in 1908 and has not reappeared in the market supply.

The supply of "medium" milk also finally disappeared. Its slight apparent increase at the second inspection in 1908 was due to the withdrawal of two of the dairies in the "good" class, as explained on page 97. The striking decrease in "medium" milk shown at the third inspection of this year was coincident with the publication of the scores of the producers as explained on page 100. The increase in the amount of "medium" milk as shown at the second inspection of 1909 immediately followed the retirement of retailers who had been selling their own product as noted on page 103. The rise in the amount of "medium" milk at the close of 1910 was mainly due to the entrance of three new dairies as explained on page 107. By the date of the final inspection business competition had brought all of the dairies into the "good" class.

Attention should be called again to the fact that in the previous summaries and in this chart the dairy has been used as the basis of computation. It would have been preferable to use the number of cows rather than the number of dairies in this connection. While the number of cows in each dairy was noted at some of the inspections this data was often omitted.

While this chart shows truly remarkable improvement it actually falls short of the truth. This is due to the fact that each dairy was given equal weight for the reason given above. The largest dairies were the ones in which improvement was most marked; thus the chart indicates that at the close of 1910 about 12.8 per ct. of the supply came from dairies in the "excellent" class, while 37 per ct. of the cows were in these 5 dairies.
CONCLUSIONS.

The first requisite for the improvement of a milk supply was a basis of values which should be sufficiently accurate as to do justice to all parties and sufficiently simple as to be understood by all of them. This want was fairly met by the dairy score card.

Payment for milk on a sliding scale based on the official dairy score and the presentation to all parties of the facts regarding the sanitary conditions under which the milk was produced and handled quickly improved the quality of the municipal milk supply. The dairymen were quick to produce the highest grade of milk for which they could obtain an adequate return.

In the last analysis the limiting factor in the improvement of a municipal milk supply is the disinclination of the consumer to pay a price which will permit the production of a first-class milk. The extent to which any supply can be improved depends ultimately upon the price at which the milk can be sold. Under the present system of indemnity for reacting animals by the State milk from tuberculin-tested cows can be furnished at an increased cost of one-half cent per quart. Without such assistance it probably would not be furnished without an advance of at least one cent per quart. While a small proportion of the public are willing to pay the additional price the majority are not.

During the past three years the improvement which has taken place in the milk supply of Geneva has been noteworthy from every point of view. While local conditions would necessitate slight modifications it is believed that the principles here outlined, of publicity and payment based on quality, might be applied with equal success in any small city, the health officials of which, by their sympathetic handling of the milk problem, could command the respect and co-operation of the milkmen and of the public.

The expense of the city due to dairy inspection has been approximately $500 per year. This amount is within the financial reach of practically all cities and cannot be considered a burden in view of the results obtained.